Summarizing the weather conditions and significant impacts across western and north central Nebraska, from May through October 2010 – this article will address the major impacts that occurred from severe weather across the region during this time frame. Events which had high impacts will be listed below, after a brief description of monthly synoptic weather conditions.

May 2010 Synopsis: During the first three weeks of May 2010, an active weather pattern was in place, with numerous cold fronts crossing the state. This resulted in below normal temperatures nearly each day across western and north central Nebraska. The pattern transitioned significantly for the last week of the month, as warm air surged north across the plains. The progressive pattern with numerous systems moving across the region continued. This brought the first of several severe weather outbreaks.

June 2010 Synopsis: The first three weeks of June were dominated by a very active pattern and many rainy days. The last week of June transitioned to a high pressure ridge with dry conditions. Most of the month, an east-west oriented boundary kept meandering throughout Nebraska and Kansas. This boundary, combined with a plethora of mid level disturbances, helped produce showers and thunderstorms. During the second week of June a strong southerly flow allowed tropical gulf moisture to push into the region, with several nights of very heavy rainfall. This rain lead to flooding of several rivers and creeks across the state. Some of the most significant, and in some areas, record flooding, occurred over parts of North Central Nebraska. The highest report from the National Weather Service Cooperative Observer network included 12.93 inches near Ericson, 12.46 inches in Taylor, and 12.22 inches near Elsmere, with 7.78 inches near Hershey and 6.41 inches just south of North Platte. For a full list of monthly rainfall totals across western and north central Nebraska, visit our web story below:

http://www.weather.gov/lbf/?n=june2010precipitation

July 2010 Synopsis: A warm and humid weather pattern persisted across western and north central Nebraska during the month. A persistent frontal boundary meandered north and south across western and north central Nebraska during July. As this front drifted through the forecast area, episodic heavy rainfall, followed by warm and dry conditions, were common during the month.

August 1010 Synopsis: A warm and humid weather pattern persisted across western and north central Nebraska during the month of August. High pressure aloft dominated the eastern half of the U.S. and migrated westward by the middle of August. As this upper ridge of high pressure migrated west it led to dry conditions during the latter half of the month.

September 2010 Synopsis: A wide range of weather occurred during the month of September across western and north central Nebraska. Temperature at times resembled summer with highs in the 90s, while a few cold fronts brought fall like temperatures with highs failing to reach 60 degrees and lows in the 30s.

October 2010 Synopsis: The weather pattern was greatly influenced by La Niña, which is associated with cooler than normal water temperatures in the Equatorial Pacific Ocean, unlike El Niño which is associated with warmer than normal water. The month was characterized by less than normal precipitation, along with milder temperatures.

Significant Weather Recap

Tornado Events

May 22nd – Cherry County. At 845 PM CDT, the tornado touched down over an open field west of Sparks and traveled east where it struck a metal building tearing off the southwest facing roof. The tornado destroyed a portion of a grandstand and completely demolished a concession stand before lifting 200

yards east of the concession stand. This tornado was rated as an EF0 with a path length just over one mile.

May 22nd – Keya Paha County. At 930 PM CDT, a tornado touched down approximately 12 miles northwest of Springview and traveled northeast for 20 minutes before lifting 11 miles north of Springview. The tornado did extensive tree damage when it touched down, then moved northeast and struck two farmsteads. At the first farmstead, a loafing shed and stock trailer were destroyed, extensive tree and fence damage occurred, and a roof was torn off an old hog building. The most extensive damage occurred north of the farmstead where six rural electric association poles where broken. The tornado continued to move northeast and destroy a windmill. Then a second farmstead was hit with the tornado destroying a 40 by 60 feet quonset building before the tornado lifted at 950 PM CDT. This tornado was rated as an EF2, with a path length of 9 miles.

June 3rd - Custer County. A brief tornado touched down and crossed the road 1 mile west of Berwyn. The storm chaser's car was hit with debris as the tornado crossed the road. This tornado was rated as an EF0 with a path length of one tenth of a mile.

June 6th - Chase County. The tornado touched down over rural open land near 3 miles northeast of Imperial. The tornado moved southeast and was spotted crossing highway 61 before lifting 4 miles east of Imperial. The tornado was rated as an EFO with a path length just over 2 miles.

June 11th – Lincoln County. A brief tornado touchdown was reported 1.7 miles southeast of Sutherland with no damage. The tornado was rated as an EFO with a path length of one tenth of a mile.

June 11th – Lincoln County. A motorist pulled off I-80 and reported a rain wrapped tornado. No damage was reported, and the tornado was rated as an EF0, with a path length of one tenth of a mile.

June 22nd – Sheridan County. A brief tornado was reported by the county sheriff at Highway 20 and 360th Lane, or about 2.1 miles southwest of Rushville. No damage was reported as the tornado touched down over a rural area. This tornado was rated as an EF0.

June 25th – Cherry County. A tornado briefly touched down over open range land, about 13 miles west northwest of Elsmere, with a path length just over nine tenths of a mile. The tornado was rated as an EF0.

June 25th – Thomas County. A supercell thunderstorm produced several funnels prior to tornado development in southwest Thomas County. The tornado touched down 18 miles southwest of Thedford over open range land, moving slowly to the southwest and lifted 19 miles southwest of Thedford. No damage was reported with the tornado. Path length was one mile, with the tornado rated as an EF0. Note: Image insert was provided by Roger and Sue Licking of funnel clouds near Thedford.

July 3rd – Sheridan County. The public reported a tornado touchdown in an open field. The tornado was rated as an EF0 and caused no damages. Path length was just one tenth of a mile.

July 17th – Lincoln County. A brief tornado rated as an EF0, touched down 4.2 miles south of North Platte. No damage was reported.

Flash Flood/Flood Events

June 10th – Holt County. Flooding was reported by the public in Atkinson after four inches of rainfall flooded the town lumberyard, and outlying areas, and produced minor flooding in town. Numerous rainfall reports of three to four inches were received in the area.

June 10th – Cherry County. The Department of Roads reported several roadways had water running across them across southeast Cherry County. At one location west of Elsmere, Goose Creek was reported still rising at 10 AM CDT, some 6 hours after the rain began. Rainfall in the area was reported to be in excess of 3 inches. A warm front lifted north overnight where thunderstorms developed over the Nebraska panhandle during the early morning hours of June 10th and moved east. Ample moisture lead to very heavy rainfall with some of the storms, in addition to large hail and damaging winds. Note: image insert of bridge washout on Highway 183 near Taylor, Nebraska.

June 12th & 13th – Widespread flooding due to heavy rain occurred across much of western and north central Nebraska. The flooding impacted Custer, Blaine, Lincoln, Logan, McPherson, Thomas, Brown, Cherry, Holt, Rock, Garfield, Wheeler, Chase, Hayes, Boyd and Wheeler counties. Total damages from the flooding were nearly 3.5 million dollars. A semi stationary front across the plains over a three day period remained the focus for thunderstorm development on June 11th. The thunderstorms developed initially on the high plains, then spread east and intensified, producing several large hail events, in western Nebraska overnight, as the low level jet strengthened storms continued producing heavy rainfall, over already saturated grounds that led to flash flooding.

Some of the more significant damage from this widespread flooding event is listed below. Heavy rains falling on already saturated ground caused widespread flooding through northern and central Custer County. Three to five inches of rain caused water to flow across the Victoria Springs Road, the Callaway Road, and Highway 92 near Merna. The rain produced a sink hole, 4 feet in depth, to form in the road between Merna and Victoria Springs. The south side of the Sargent Diversion Dam collapsed, sending a tremendous amount of water to the Comstock Diversion Dam which held the water. Numerous rural roads were also severely damaged.

In Lincoln County, thunderstorms with prolonged heavy rain falling on already saturated ground caused widespread flooding across northwest Lincoln County. Up to 6 inches of rain fell with severely damaged rural roads. The intersection of Range and Walker Road was washed out.

In Loup County, significant damage occurred as a result of the heavy rains and flooding. Thunderstorms with prolonged heavy rain falling on already saturated ground caused widespread flooding. A foot of water covered Highway 91 from mile marker 35 to 37 between Brewster and Taylor. The Highway 183 bridge across the North Loup River was washed away as 4 to 6 inches of rain fell over the river basin. Numerous secondary roads were under water or washed away.

In Holt County **-** Thunderstorms with prolonged heavy rain falling on already saturated ground caused widespread flooding. Water flowed over Highway 20 at Inman, Highway 281 south of O'Neill, and the intersection of Highways 95 and 11 to the west of Chambers. The approach to the bridge over the south fork of the Elkhorn River near Ewing was washed away. Numerous secondary roads were under water or washed out. A cooperative observer 7 miles southwest of Amelia reported 4.28 inches of rain.

In Wheeler County, Ericson Dam failed in southern Wheeler County, on Sunday evening, June 13th. Heavy rainfall contributed to water levels at the Ericson Dam that exceeded the maximum dam height, and water flowed into the emergency spillway. As debris gathered the spillway began to erode before 7 p.m. CST and the spillway breached, thereafter causing water to drain from the lake. Water levels behind the dam were estimated at 23 or 24 feet prior to dam failure. The floodwater flowed down Cedar River where the floodwater impacted approximately 15 homes and farmland in Wheeler County. At 845 p.m. CST, the floodwater reached the Wheeler and Greeley County line, with 6 inches of water was flowing over the Highway 281 bridge.

June 20th – Flash Flooding occurred, due to heavy rains over parts of Chase County. Thunderstorms produced heavy rainfall for over two hours as storms moved slowly northeast. Law enforcement reported

water running over the old Wauneta road and other county roads northwest of Wauneta. In addition, storm total rainfall was estimated near 4 inches with the Cooperative Observer at Imperial, Nebraska reporting 2.75 inches.

June 21st – In Hayes County, Stinking Creek overflowed its banks and is flooding adjacent fields. No structures were damaged. The crest of the river was located between Hamlet and Palisade.

June 22nd – Sheridan County reported flash flooding which occurred over roads in Gordon. Law enforcement personnel stopped people from driving on roads and areas with ponding water.

July 7th – Deuel County reported Flash Flooding due to heavy rains, which caused Highway 385 to be closed near Chappell. Highway 30 in far western Deuel County was reduced to only one lane of traffic due to flooding.

July 22nd - Thunderstorms passing over the same area produced six to nine inches of rainfall in northern Holt and central Boyd counties. Several roads were closed due to water flowing across the roads to include Highway 12 between Bristow and Lynch, while numerous roads were washed out 9 to 12 miles north of Stuart. Spencer Dam authorities announced that the dam had reached capacity resulting in high releases of water downstream of the dam.

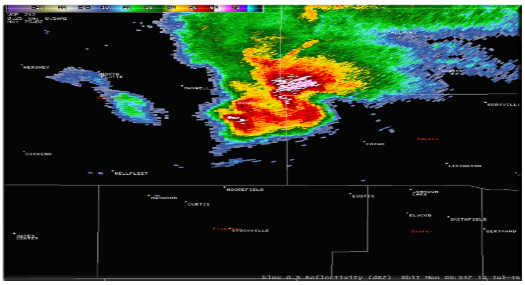
September 22nd – Custer County had Flash Flooding, due to heavy rainfall. The heavy rains led to the failure of a 50 foot dam about 3 miles southwest of Broken Bow on Highway 21. Flood water moved towards the southwest edge of Broken Bow and impacted the Callaway road one mile west of town. Rainfall gage estimates measured up to 4.5 inches with several streets and homes in Broken Bow flooded.

September 22nd – In Lincoln County,heavy rainfall cause county road damage six miles north of Wellfleet on Nelson road and in the Medicine Canyon. Standing water covered several roads and caused washouts. The heavy rainfall also caused road damage 11 miles south of Maxwell at the junction of South Cottonwood Canyon road and South Effenbeck road.

A second round of storms formed in the warm and humid air located south of the warm front Wednesday during the evening hours. Training of thunderstorms moving northeast through portions of Lincoln and Custer counties led to flash flooding. A few severe thunderstorms produced damaging winds and hail while moving across Custer County.

Convective Wind Events

July 11th - A long-lived supercell thunderstorm moved southeast, along a nearly stationary frontal boundary. As the storm moved southeast, it produced large hail and damaging winds – causing over $10 million dollars in crop damage. Severe thunderstorms produced large hail the size of golf balls and damaging winds over 60 mph across parts of western and north central Nebraska Sunday afternoon and Sunday night. A stationary frontal boundary was responsible for the storms, which first developed in the eastern Nebraska panhandle during the afternoon. One intense, long-lived storm known as a supercell moved southeast along the front and produced several hail reports along its path, as well as a peak wind gust of 67 mph at the North Platte airport at 7:00 p.m. CDT. The initial round of storms moved out of the area by sunset, but a disturbance in the upper levels of the atmosphere resulted in additional storms along the front late. One of the most intense storms was a supercell that produced baseball size hail 6 miles north of Ellsworth at 1045 p.m. MDT, and golf ball size hail 10 miles southeast of Ashby in rural Grant



County at 11:31 p.m. MDT. Note Doppler radar image of high wind rear inflow notch signature exiting Lincoln County.

August 8th - A cluster of strong to severe thunderstorms caused widespread wind damage, along with hail and crop damage, over Holt County - near Stuart, Atkinson and O'Neill. On the afternoon of August 8th, severe convective wind damage occurred - with an estimated 60 to 70 mile an hour winds common across the area, along with hail from quarter to golf ball size in diameter. In addition to the gusty and damaging winds, heavy rainfall also accompanied these storms as they pummeled parts of north central Nebraska.

August 16th - Violent straight line wind damage occurred across portions of Holt County again on Monday, August 16th - in association with severe thunderstorms which rolled across the region during the afternoon. 60 to 80 MPH wind gusts were reported - with power lines downed and a metal pole building moved off a foundation just north of Stuart. Large tree branches were down in both O'Neill and Ewing according to the dispatcher for Holt County.

August 30th - Severe thunderstorms caused convective wind damage on Monday, August 30th - as they marched across western and north central Nebraska. Wind damage was reported in Frontier, Custer, Brown, Blaine, Holt, and Boyd counties. The wind damage occurred in two main swaths. One began in southwestern Nebraska around McCook and Stockville, and extended northeast past Lexington and Broken Bow, Brewster, Burwell, Chambers, O'Neill, and Lynch, and then continued all the way into South Dakota. The storms covered that distance of over 200 miles in only four hours. Wind gusts of 50 to 70 mph were common along that line.

The second swath of damaging winds caused the most significant damage of the event in Ainsworth, in Brown County. Trees and power lines were blown down by winds estimated to be 80 miles an hour by law enforcement personnel. A storage barn and a horse barn were completely destroyed by the ferocious winds.

A wet microburst impacted Ainsworth with significant damage, including the destruction of two buildings and many trees, along with downed power lines. The damage was most severe in a relatively concentrated zone, on the north side of town. Note: photograph is of wet microburst exiting Ainsworth.

More information about this event can be found here:

http://www.crh.noaa.gov/lbf/?n=100830_ainsworth_microburst

http://www.crh.noaa.gov/lbf/?n=convectivewinddamage

October 8th - A cluster of severe thunderstorms developed near a cold front in the eastern Nebraska panhandle on Friday afternoon. The storms produced 60 to 80 mph winds as they raced northeast across parts of the Sandhills at speeds close to 50 mph. The winds downed tree limbs and power lines in the Arthur and Mullen areas. In Valentine, the winds downed large tree limbs and ripped a roof off of a trailer. There wasn't much rain with these storms due to a dry air mass with low relative humidity values. This actually aided the severe winds by allowing moisture to evaporate beneath the thunderstorms, which in turn caused cold air to sink rapidly to the ground, where it spread out and caused the high winds. The combination of severe winds and little rainfall, allowed one of the downed power lines to spark a prairie fire north of Arthur, and resulted in visibility below a quarter mile in blowing dust and sand in Valentine when the severe storms rolled through town near 6:30 p.m. CDT.

Large Hail

Hail is a frequent occurrence across western and north central Nebraska during the convective season.

Below is a brief summary of hail reports of 2 inches in diameter or greater which occurred during the time frame from May through October 2010.

Location	Size of Hail	Date	Time of Occurrence
8.7 ESE Merritt Reservoir	2.75”	May 29th, 2010	646 PM CDT
4.6 SW Hyannis	2.00”	June 4th, 2010	700 PM CDT
4.3 SSE Dunning	2.75”	June 5th, 2010	150 AM CDT
0.5 W Hamlet	2.00”	June 22nd, 2010	903 PM CDT
10.6 NNW Hamlet	2.00”	June 22nd, 2010	903 PM CDT
1.3 ESE Oconto	2.50”	July 10th, 2010	700 PM CDT
9.0 SSW Newport	2.00”	July 11th, 2010	640 PM CDT
5.3 NNE Ellsworth	2.75”	July 11th, 2010	1045 PM CDT
13.9 N North Platte	2.00”	July 20th, 2010	126 AM CDT
12.3 NE Maxwell	2.00”	July 20th, 2010	205 AM CDT
3.6 NE Stuart	2.00”	August 8th, 2010	250 PM CDT
4.9 NNE Inman	2.50”	September 22nd, 2010	1105 AM CDT

For some of the highlights during the volatile periods mentioned above, here are highlights below:

Keya Paha Tornado Path on May 22nd:
http://www.crh.noaa.gov/lbf/?n=keyapahatornadopath

Evolution of a Severe Weather Event May 24th:
http://www.crh.noaa.gov/lbf/?n=evolution

Radar Depiction of Tornadoes near Thedford on June 25th:
http://www.crh.noaa.gov/lbf/?n=radardepiction

Tornado Imagery from Thomas County on June 25th:
http://www.crh.noaa.gov/lbf/?n=thomasctytornadoimagery

Wind Damage Occurs Again In Holt County on August 16th:
http://www.crh.noaa.gov/lbf/?n=winddamageholtcounty

Convective Wind Damage from August 30th:
http://www.crh.noaa.gov/lbf/?n=convectivewinddamage

Wet Microburst Caused Significant Damage in Ainsworth:

http://www.crh.noaa.gov/lbf/?n=100830_ainsworth_microburst

http://www.crh.noaa.gov/lbf/?n=convectivewinddamage

Severe Weather & Flash Flooding on September 22nd

http://www.crh.noaa.gov/lbf/?n=2010_0922_stormreports

Page composition
by
Steve Carmel